that of two faint and broad prismatic images, situated in a line perpendicular to that which joins the common coloured images, led the author to the further discovery of the mode in which the fibres are united laterally to each other, so as to resist separation, and form a continuous spherical surface. By viewing a well-prepared lamina with a microscope of high magnifying power, he observed that the fibres are united by a series of teeth, locking into one another, exactly like those of rack-work. The breadth and depth of each tooth are about the fifth part of the breadth of the fibre itself, and all the adjacent surfaces are in perfect optical contact. This denticulated structure exists in the lenses of every fish which the author examined. In that of the cod, the number of teeth in each fibre was found to be 12,500; and since the number of fibres in the whole lens is 5,000,000, the total number of teeth amount to 62,500,000,000.

The same structure obtains universally, as far as the author has examined it, in the lenses of birds; but he has never met with it in any of the Mammalia, not even in the Cetacea. It was found in two species of lizards, and in the Ornithorhynchus.

In the concluding part of the paper the author enters into some details as to the doubly-refracting structure of the crystalline lens of the cod and of other animals, in which several curious varieties are observable with regard to the relative positions of the strata giving positive or negative double refractions. In the prosecution of this subject he was led to the observation of a series of very curious phenomena, which he announces as the subject of a future communication to the Royal Society.

A paper was also read, entitled, "On the present Situation of the Magnetic Lines of Equal Variation, and their Changes on the Terrestrial Surface." By Peter Barlow, Esq., F.R.S.

The author has undertaken the task of collecting and arranging all the authentic information respecting magnetic variation which has been recorded in the accounts of several recent voyages and journeys of discovery. The inconvenience from the distortion and interruptions of the lines of equal variation laid down on maps or charts, induced him to trace them on a globe, where they can, of course, be exhibited in their natural situation, and in regular continuity: and he has been careful to mark only such as are deduced from actual observation. The examination of the lines thus laid down shows them to be dependent on definite and general laws, and not on local influences; their inflexions and curvatures presenting systems of great regularity, and being exempt from those abrupt and angular configurations which such local disturbances might be expected to produce: neither do they appear to be consistent with the hypothesis of the action of a certain definite plurality of magnetic poles.

The author next offers some observations on the progressive changes which these lines undergo in their places and configurations, and shows their agreement with the hypothesis of a revolution of the magnetic poles for each place round the poles of the earth; each respec-

The Royal Society is collaborating with JSTOR to digitize, preserve, and extend access to
Abstracts of the Papers Printed in the Philosophical Transactions of the Royal Society of London.
www.jstor.org

tive place having its own particular pole, the revolving motion of which is regulated by some general but hitherto unknown law.

May 16, 1833.

HIS ROYAL HIGHNESS THE DUKE OF SUSSEX, K.G., President, in the Chair.

A paper was read, entitled, "Note on a Paper by Dr. John Davy, entitled, 'Notice on the Remains of the recent Volcano in the Mediterranean.'" By Charles Daubeny, M.D., F.R.S., Professor of Chemistry in the University of Oxford.

From the circumstance that azotic gas is frequently evolved from thermal springs, the author infers that this phenomenon is in some way connected with volcanic action; and this he considers to be the case in the instance observed by Dr. Davy, although referred by him to the decomposition of atmospheric air during putrefactive processes going on at the bottom of the sea. Dr. Daubeny offers objections to the theory of that gas rising to the surface in consequence of the high temperature to which it has been subjected. He conceives that the air which Dr. Davy examined cannot have been derived from sea-water, but must have originated from the atmosphere itself, with which the volcano communicated. The author is disposed to attach great importance to the accurate examination of the gases given out by warm springs, and recommends the prosecution of the inquiry.

A paper was also read, entitled, "Experimental Researches on Atomic Weights." By Edward Turner, M.D., F.R.S. Lond. and Edinb., Professor of Chemistry in the University of London.

This paper is a continuation of the Essay, by the same author, on the Composition of the Chloride of Barium, which was published in the Philosophical Transactions for 1829. Having shown that the atomic weights current among British chemists, though in some instances correct, or tolerably approximative, have, as a whole, been adopted on insufficient evidence, he proceeds, in this paper, to give an account of the experiments he has made to ascertain the equivalent numbers for lead, chlorine, silver, barium, and nitrogen. Finding, with reference to lead, that the method adopted by Berzelius did not afford uniform results, he endeavoured to ascertain the quantity of subsulphate of lead which given weights of metallic lead and the protoxide of that metal respectively produce. He details the mode he employed for the conversion of metallic lead into the subsulphate by a mixture of nitric and sulphuric acids, diluted with an equal bulk of water, and the precautions he adopted to avoid loss. The mean of three experiments gave 146·375 grains of sulphate of lead for 100 grains of metallic lead. By the mean of four experiments, Berzelius had obtained, instead of the former number, 146·419. Dr. Turner adopts the mean of the whole, namely, 146·41. By prosecuting this inquiry,